

TAXONOMIC ADJUSTMENTS IN NORTH AMERICAN *ASTER* SENSU
LATISSIMO (ASTERACEAE: ASTEREAEE)

Guy L. Nesom

Texas Regional Institute for Environmental Studies, Sam Houston State University,
Huntsville, Texas 77341-2506 U.S.A.

ABSTRACT

Taxonomic adjustments and comments on differences in treatment are made and noted for species and species groups of North American *Aster* in the broadest sense, based on recent literature and observations. The following new combinations are made in *Symphyotrichum*: *S. eatonii* (A. Gray) Nesom, *comb. nov.*, *S. praealtum* var. *nebraskense* (Britton) Nesom, *comb. nov.*, and *S. kralii* Nesom, *nom. nov.* (for *Aster pinifolius* Alex.).

KEY WORDS: *Symphyotrichum*, *Aster*, Astereae, Asteraceae, nomenclature

Since the appearance of a morphologically based review of *Aster* L. s. lat. and proposal of a system of segregate genera for the American species (Nesom 1994), several recent publications have treated groups of these species. Xiang & Semple (1996) presented the results of their molecular analysis (restriction site variation in cpDNA) of North American *Aster*. Semple *et al.* (1996) have provided a detailed floristic guide to the Ontario asters, including those they retained in *Aster* s. str. and those of several genera recognized outside of *Aster* (*Doellingeria* Nees, *Oclemena* Greene, and *Diplactis* Rafin.), and Labrecque & Brouillet (1996) have provided clarifications in the definitions and nomenclature of a group of species recognized as *Symphyotrichum* Nees sect. *Symphyotrichum* in my treatment (see further comments below). Taxonomic modifications and comments based on these sources and other recent observations, as they affect the system proposed in Nesom (1994), are summarized in the present paper.

The North American species group retained as *Aster* by Semple *et al.* (1996) is equivalent to the group of genera comprising the "Eurybian lineage" of Nesom (1994), with three (or four) exceptions: (1) they exclude the northwestern North American genus *Oreostemma* Greene (also treated as a valid genus by Nesom 1994); (2) they exclude the western North American species *Aster integrifolius* Nutt., which I treated within the genus *Eurybia* (Cass.) S.F. Gray as the monotypic sect. *Integrifoliae* Nesom (Nesom 1994); and (3) they apparently exclude the monotypic genus *Herrickia*

Woot. & Standl. of New Mexico and Colorado (included within *Eurybia* by Nesom [1994], see notes below). The genus *Psilactis* A. Gray was mentioned by Semple *et al.* (p. 2) as one of the groups included in *Symphyotrichum* s. lat. (sensu Semple & Xiang), but it was omitted in the list of synonyms of *Aster* s. str. in North America (1996, p. 26), even though other non-Ontario taxa were included in the list.

The decision by Semple *et al.* to maintain the largest groups of North American species within *Aster* is based on the phylogenetic arrangement of species from the cpDNA study by Xiang & Semple (1996) and on pragmatic grounds (see comments below).

Xiang & Semple (1996) found the generic type of *Aster*, *A. amellus* L., to be phyletically imbedded within the species group recently recognized as *Eurybia* sect. *Eurybia* (Nesom 1994). *Aster amellus* was placed in a position widely separate from the only other Old World species in the Xiang & Semple analysis, *A. alpinus* L., which Semple (in Semple *et al.* 1996) transferred to the Rafinesquian genus *Diplactis* (see comments below). Based on my survey of morphology and cytology of Old and New World species, I conclude that the evolutionary development of Old World *Aster* has been independent from the New World *Eurybia* and "Eurybian lineage." The primarily Eurasian but nearly circumboreal *A. alpinus* is the American species most closely related to *Aster* sect. *Aster*, which I regard as strictly an Old World group. The phylogenetic position of *A. amellus* needs further investigation.

The groups treated as *Eurybia* and *Sericocarpus* Nees in Nesom (1994) show in the Xiang & Semple analysis to be sister groups and distinct from the remainder of the Eurybian lineage (= the large genus *Symphyotrichum* and its "satellites"). Semple (in Semple *et al.* 1996, p. vii) outlined the pattern of his decision regarding "whether or not to retain the *Symphyotrichum* group of genera (including *Virgulus*) in the redefined *Aster* or to recognize one or more of these as separate genera." "Because many, perhaps most, users of [the Ontario] guide may be reluctant to adopt the new nomenclature, [he] finally decided to retain the entire *Symphyotrichum* group in *Aster*" but noted that he believes that further "research will strengthen the case for breaking up *Aster* even more than is done here."

I have only a few strong disagreements with the broad topologic outlines of the two cpDNA cladograms from Xiang & Semple summarized in Semple *et al.* (1996). Morphology indicates that *Sericocarpus* plus *Eurybia* form the sister group to *Symphyotrichum* and a group of smaller genera related to it, and this apparently is confirmed by the molecular data of Xiang & Semple. The most serious conflict in my view is that *Aster amellus* should be positioned next to *A. alpinus*, near the bottom of the arrangement, rather than amidst the species of sect. *Eurybia*. Other species in the Xiang & Semple analysis needing further investigation of their phylogenetic position are noted below (*Eurybia glauca* [Nutt.] Nesom; *Oclemena reticulata* [Pursh] Nesom).

Symphyotrichum: taxonomic modifications and observations.

* *Symphyotrichum ciliolatum* (Lindl.) Löve & Löve includes *S. subgeminatum* (Fern.) Nesom (Hay *et al.* 1990; Labrecque & Brouillet 1996) simply as part of the

normally variable species. Neither are other infra-specific taxa recognized with *S. ciliolatum* (Brouillet 1981).

* *Symphotrichum cordifolium* (L.) Nesom is treated as a variable species without formally recognized varieties. *Symphotrichum sagittifolium* (Wedem. ex Willd.) Nesom s. str. is regarded as a synonym of *S. cordifolium* (see Semple *et al.* 1996), although Jones (1989, 1990) has retained an entity by this name at varietal level within *S. cordifolium*, suggesting that it may have acquired its distinction through hybridization with other species. Jones (1990) also has a different idea regarding the identity of the *S. sagittifolium* type. Research, clarifications, and a better consensus are obviously needed in this complex.

* *Symphotrichum drummondii* (Lindl.) Nesom var. *texanum* (Burgess) Nesom is observed to include *S. drummondii* var. *parviceps* (Shinners) Nesom.

* *Symphotrichum dumosum* (L.) Nesom var. *dodgei* (Fern.) Nesom is observed to be either a growth form of *S. dumosum* var. *strictior* (Torr. & Gray) Nesom or else a hybrid, *S. dumosum* × *S. boreale* (Torr. & Gray) Löve & Löve (see Semple *et al.* 1996). It is tentatively accounted for here as a synonym of *S. dumosum* var. *strictior*.

* *Aster eatonii* (A. Gray) Howell is taken as the correct name (in *Aster*) for what I previously treated as *Symphotrichum bracteolatum* (Nutt.) Nesom. Cronquist (1990; 1994) regarded the type specimen of *A. bracteolatus* Nutt. as morphologically intermediate between *Aster eatonii* and *A. hallii* A. Gray, noting (1990, p. 129) that "Conceivably the specimen reflects hybridization between the two species it most resembles." Following Cronquist's suggestion (p. 129), "the name [*A. bracteolatus*] should remain in limbo as a nomen dubium."

Symphotrichum eatonii (A. Gray) Nesom, *comb. nov.* BASIONYM: *Aster foliaceus* var. *eatonii* A. Gray, *Synopt. Fl.* 2(1):194. 1884. *Aster eatonii* (A. Gray) T.J. Howell, *Fl. N.W. Amer.* 310. 1900.

* *Symphotrichum eulae* (Shinners) Nesom is a distinct and stable species endemic to north-central Texas, not to be indicated as a hybrid (Nesom in prep.).

* *Symphotrichum firmum* Nees (Nesom) is treated as a synonym of *S. puniceum* (L.) Nesom var. *puniceum* (Labrecque & Brouillet 1996).

* *Symphotrichum novi-belgii* (L.) Nesom. The observations and suggestions of Labrecque & Brouillet (1996) and Brouillet & Labrecque (1997) are followed here.

Symphotrichum novi-belgii var. *tardiflorum* (L.) Nesom (= *Aster tardiflorus* L. s. str.) is observed to be a hybrid (*S. puniceum* × *S. cordifolium*) that should not be treated as a synonym or variety of *S. novi-belgii*.

Symphotrichum novi-belgii var. *litoreum* (A. Gray) Nesom is treated as a synonym of *S. praealtum* (Poir.) Nesom var. *praealtum*.

Symphotrichum crenifolium (Fern.) Nesom is treated as a variety of *S. novi-belgii*.

Aster novi-belgii var. *villicaulis* (A. Gray) Boivin is treated as a variety of *Symphotrichum novi-belgii*. This taxon and its equivalent, *A. johannensis* Fern., were previously regarded as synonyms of *S. anticostense* (Fern.) Nesom.

Symphotrichum longifolium (Lam.) Nesom s. str. is considered a synonym of *S. novi-belgii* var. *novi-belgii*. The entity referred to as "*Aster* <<*longifolius*>>" by Labrecque & Brouillet and by most earlier authors, is instead *Aster robynsianus* Rousseau (see Semple *et al.* 1996, following a communication from Luc Brouillet). New combinations required to instate this nomenclature in *Symphotrichum* are made by Brouillet & Labrecque (1997).

* *Symphotrichum ontarione* (Wieg.) Nesom includes a varietal entity from Ontario and Québec formally described in Semple *et al.* (1996). The nomenclatural combination in *Symphotrichum* was made by Brouillet & Labrecque (1997).

* *Aster pinifolius* Alexander is recognized as a distinct species endemic to Florida, following the observations of Kral (1983). It is formally instated within *Symphotrichum* by the following, recognizing the botanist who sharpened our awareness of its distinction.

Symphotrichum kralii Nesom, *nom. nov.* BASIONYM: *Aster pinifolius* Alexander in Small, *nom. illeg.*, *Man. Southeastern Fl.* 1387, 1509. 1933. Not *Aster pinifolius* Nees, *Synops. Aster.* 29. 1818.; not *Aster pinifolius* F. Muell., *Fragm. Phytogr. Austr.* 5:71. 1866.

* *Symphotrichum praealtum* (Poir.) Nesom. As noted by Jones (1992, p. 33), "The plants are variable, but varieties that have been recognized cannot readily be delimited because of a high degree of morphological intergradation and an apparent lack of convincing geographic range separation." At least there seems to be no justification for maintaining var. *texicola* (Wieg.) Nesom, which should be treated as a synonym of var. *praealtum*. On the other hand, Jones (1980) has proposed that the Texas plants now identified as *S. praealtum* be called *A. coerulescens* DC. instead, observing that this population system may be of hybrid origin between *S. praealtum* and *S. lanceolatum* (Willd.) Nesom. Shinnery (1949), in contrast, had no hesitation in equating the type of *A. coerulescens* and the Texas plants similar to it with *S. praealtum*. Semple *et al.* (1996) note that *S. praealtum* var. *angustior* (Wieg.) Nesom is an octoploid race native to the northeastern United States. The status of var. *subasperum* (Lindl.) Nesom remains questionable. To accommodate existing treatments, var. *nebraskense*, a conspicuously hairy entity within the species near the

western edge of its range, needs to be recognized (e.g., Cronquist 1980), although its distinction from var. *subasperum* needs to be clarified.

Symphytotrichum praealtum (Poir.) Nesom var. *nebraskense* (Britton) Nesom, *comb. nov.* BASIONYM: *Aster praealtus* var. *nebraskensis* Britton in Britton & Brown, *Illus. Fl.* 3:375. 1898.

* *Symphytotrichum puniceum* (L.) Nesom var. *calderi* (Boivin) Nesom (= *Aster calderi* Boivin) is treated without formal status within *S. puniceum*. These small plants near the northern extreme of the species' range in Québec apparently are reduced in size in response to cold and a short growing season (Brouillet, pers. comm.). With the downgraded rank of var. *calderi*, *S. puniceum* is now regarded as a variable species with only two formally recognized varieties. The rare *S. puniceum* var. *scabricaula* (Shinners) Nesom occurs on the Gulf Coastal Plain from Mississippi to Texas (Nesom in ms.).

* *Aster schistosus* Steele has been recognized from Virginia as a shale barren endemic. It has been considered a synonym of the more widespread *Symphytotrichum lowrieianum* (Porter) Nesom (e.g., Fernald 1950), as both taxa may have originated as hybrids between *S. cordifolium* and *S. laeve* (L.) Löve & Löve, but a distinction can be made between the two (e.g., Gleason & Cronquist 1991; and see Jones 1980 for broader comments on *S. lowrieianum*).

* *Symphytotrichum spathulatum* (Lindl.) Nesom. Cronquist's assessment (1994) has been followed in adopting this as the name for the species commonly known as *Aster occidentalis* (Nutt.) Torr. & Gray. *Symphytotrichum spathulatum* var. *fremontii* (Torr. & Gray) Nesom is added here to the synonyms of var. *spathulatum*.

* Labrecque & Brouillet (1996) have pointed out a serious problem in the typification of *Symphytotrichum*. The generitype, from the original description by Nees, is *S. unctuosum* Nees. Relying on earlier students of the genus (including J. Lindley, A. Gray, A. Cronquist, and A. Jones), but without having seen the type, I took this name as a synonym of *A. tardiflorus*, which in turn has been regarded as conspecific with *A. novi-belgii*. Labrecque & Brouillet, however, observe that the type of *A. tardiflorus* former appears to be a hybrid between *S. puniceum* (sect. *Symphytotrichum*) and *S. cordifolium* (sect. *Cordifolii*). Gray (in Torrey & Gray 1841) first observed that *S. unctuosum* was conspecific with *A. tardiflorus* but later (1884) noted that it was equivalent to *A. novi-belgii* var. *litoreus* A. Gray, which Labrecque & Brouillet observe to be a synonym of *S. praealtum* (sect. *Dumosi*). Thus, depending on a critical examination of the type specimen for *S. unctuosum*, it is possible that the generitype might be assigned to any of three sections within subg. *Symphytotrichum*, as tentatively structured in Nesom (1994). Whatever the resolution may be, it will not affect the nomenclature of any of the species of *Symphytotrichum*.

Jones (1980, p. 258) presented a different view on the identity of the *Aster tardiflorus* type and its relationship to *A. novi-belgii*, observing that the two taxa "intergrade extensive and can often be distinguished only with difficulty." More recently (e.g., 1987), she has treated *A. tardiflorus* as a variety of *A. novi-belgii*.

Miscellaneous observations.

* *Eurybia* sect. *Herrickia*. In changing the rank of the genus *Herrickia* to a section within *Eurybia*, I inexplicably substituted "Torr. & Gray" as the authority for the name at sectional rank. The nomenclatural statement should have been *Eurybia* sect. *Herrickia* (Woot. & Standl.) Nesom, *comb. nov.*, based on *Herrickia* Woot. & Standl., *Contr. U.S. Natl. Herb.* 16:186. 1913.

* *Eurybia glauca* (Nutt.) Nesom (= *Aster glaucodes* S.F. Blake) is positioned in the cpDNA analysis of Xiang & Semple (1996) within the genus *Eucephalus* Nutt. Several achenial and capitular features of *Eurybia glauca* are unusual compared to other species of *Eurybia* (Nesom 1994), but I conclude that it is most closely related to species placed in *Eurybia* sect. *Herrickia*. The morphology of *Eurybia glauca* does not support its placement in *Eucephalus*.

* *Aster chasei* G.N. Jones, according to Semple *et al.* (1996, p. 30), is among the six "Biotian" species recognized by studies of Lamboy and colleagues (*e.g.*, Lamboy *et al.* 1991). New information or a new interpretation may be involved in this observation, but I have regarded *A. chasei* as a synonym of *Eurybia schreberi* (Nees) Nees, based on the accounting by Lamboy & Jones (1987).

* *Aster integrifolius* Nutt. was positioned within *Eurybia* as the monotypic sect. *Integrifoliae* Nesom and described as "seemingly isolated within the genus" (Nesom 1994, p. 193). It may prove to be separate from *Eurybia*, as suggested by the analysis of Xiang & Semple (1996), but at least we are agreed that it does not belong within *Aster* s. str.

* *Oclemena reticulata* (Pursh) Nesom is positioned in the cpDNA analysis of Xiang & Semple (1996) among the species of *Doellingeria*, where it also was treated by Semple, *et al.* (1991). The morphology of this species, however, appears unequivocal in allying it with the other taxa accepted by Semple *et al.* (1996) within *Oclemena*. I do not find that *O. reticulata* "has fruit traits that are intermediate between those of *Doellingeria umbellata* [(Mill.) Nees] and *Oclemena acuminata* [(Michx.) Greene]," as implied by Semple *et al.* (1996, p. 24).

* *Almutaster* (*Aster*) *pauciflorus* (Nutt.) Löve & Löve is consistently positioned by the Xiang & Semple analysis within the upper branches of *Symphotrichum* (sensu Nesom 1994) as a close relative of *S. tenuifolium* (L.) Nesom of sect. *Oxytripolium*. Students of the genus have noted evidence for such a relationship (see review in Nesom 1994), but I maintained *A. pauciflorus* as the monotypic genus *Almutaster* Löve & Löve on the basis of its distinctive morphology and its close similarity to *Psilactis* (which was not sampled by Xiang & Semple).

* Recognition of *Diplactis* as a genus may prove to be desirable, but *cpDNA* data from only two Old World species provide weak justification for the decision to transfer species to that taxon. Details of Old World species groups were discussed in Nesom (1994) and it was noted that a number of them appear to be isolated. That survey indicates Old World species are phylogenetically separate from autochthonous New World ones but that "there is no firm evidence or explicit hypothesis that Old World *Aster* is monophyletic" (Nesom 1994, p. 150).

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